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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,179	04/14/2004	Yingxue Li	P-9251-US	6360

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EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	**PAPER NUMBER**
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/824,179	LI, YINGXUE	
	Examiner	Art Unit	
	Adolf DSouza	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29* is/are allowed.

6)☒ Claim(s) *1 - 6, 10 - 15, 19 - 24, 28* is/are rejected.

7)☒ Claim(s) *7 - 9, 16 - 18, 25 - 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 - 2, 6, 10 - 11, 15, 19 – 20, 24, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastalo (US 20010047424) in view of Kuchi (US 20020172293) and further in view of Rouquette et al. (Transmit Diversity Wireless Communication, which has been provided by the applicant in his IDS).

Regarding claim 1, Alastalo discloses a method for processing diversity signals (Fig. 3), comprising:

receiving a first plurality of diversity signals at a plurality of antennas, the first plurality of diversity signals comprising communicated information, the plurality of antennas associated with a plurality of channel paths (Fig. 3; paragraph 40);

adjusting a phase of each diversity signal of at least a subset of the first plurality of diversity signals (paragraph 40, line starting with "The correction block E1 ..."; wherein the phase is adjusted using the time and frequency offset corrections);

combining the first plurality of diversity signals to form a combined signal (Fig. 3, element C which combines the signals from the various antenna paths; paragraph 40, 14th last line starting with "From the radio channel ...");

processing the combined signal to yield the communicated information (Fig. 3, elements S, EQ, DEC ; paragraph 40, last 6 lines);

determining a combined complex channel gain estimate of the first plurality of diversity signals from the combined signal (Fig. 3, element S; paragraph 40, last 6 lines; wherein the combined complex channel gain estimate is the new channel estimation (H) that is performed in the second estimation block S).

Alastalo does not disclose calculating the individual channel gains from the combined channel gains, calculating a plurality of phase adjustments and applying the phase adjustments.

In the same field of endeavor, however, Kuchi discloses calculating an individual complex channel gain estimate for each of the plurality of antennas from the combined complex channel gain estimate (Fig. 5, elements 504, 506a, 506b; paragraphs 40, 41; wherein the individual channel estimates are obtained from the combined channel estimator 504) ;

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Kuchi, in the system of Alastalo since

obtaining the individual channel estimates would allow each path to be decoded separately.

In the same field of endeavor, however, Rouquette discloses:

establishing a plurality of phase adjustments associated with the plurality of channel paths according to the plurality of individual complex channel gain estimates (Fig. 2, receiver 20; paragraph 47; wherein the phase adjustments are interpreted as being part of the weights applied from the channel estimators);

applying the plurality of phase adjustments to a second plurality of diversity signals, the second plurality of diversity signals comprising next communicated information (Fig. 2, receiver 20; paragraph 47; wherein the phase adjustments are interpreted as being part of the weights applied from the channel estimators);

and processing the second plurality of diversity signals to yield the next communicated information (Fig. 1; which shows how the symbols transmitted are spread across time slots. These same time slots are processed on the receiver side using the phase information obtained from the channel estimation weights).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Rouquette, in the system of Alastalo since this would enable the phase corrections to be obtained and applied to the individual paths.

Regarding claim 2, Alastalo does not disclose the 1st and 2nd plurality of signal having time intervals.

In the same field of endeavor, however, Rouquette discloses the first plurality of diversity signals has a number of time intervals; and the second plurality of diversity signals has the same number of time intervals, the number of time intervals being greater than or equal to the number of the plurality of antennas (Fig. 1; which shows how the symbols transmitted are spread across time slots. These same time slots are processed on the receiver side using the phase information obtained from the channel estimation weights).

Regarding claim 6, Alastalo discloses calculating the individual complex channel gain estimate for each of the plurality of antennas from the combined complex channel gain estimate further comprises assuming a complex channel to be constant over a duration of the first plurality of diversity signals (paragraph 50, 1st 8 lines).

Claims 10 – 11, 15 are directed to apparatus of the same subject matter claimed in method/steps claims 1-2 and 6 respectively and therefore, are rejected as explained in the rejections of claims 1-2 and 6 above.

Claims 19 - 20, 24 are directed to apparatus of the same subject matter claimed in method/steps claims 1 - 2 and 6 respectively and therefore, are rejected as explained in the rejections of claims 1 - 2 and 6 above.

Claim 28 is directed to apparatus of the same subject matter claimed in method/steps claim 1 and therefore, is rejected as explained in the rejection of claim 1 above.

3. Claim 3,12, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastalo (US 20010047424) in view of Kuchi (US 20020172293) and further in view of Rouquette et al. (Transmit Diversity Wireless Communication, which has been provided by the applicant in his IDS) and Papasakellariou (US 6526090).

Regarding claim 3, Alastalo does not disclose despreading, weighting, combining, decoding of the combined signal.

In the same field of endeavor, however, Papasakellariou discloses processing the combined signal to yield the communicated information further comprises:

despreading a traffic channel embedded in the combined signal to form a plurality of finger signals, a finger signal corresponding to a multipath component of the combined signal (Fig. 2, element 24; column 6, line 18 - column 7, line 30);

weighting each finger signal to yield a plurality of weighted finger signals (column 6, line 18 - column 7, line 30);

combining the plurality of weighted finger signals to yield a combined finger signal (column 6, line 18 - column 7, line 30);

and decoding the combined finger signal to determine the communicated information (Fig. 2,,element 30).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Papasakellariou, in the system of Alastalo since this would allow decoding the combined received signal as done in a conventional Rake receiver.

Claims 12, 21 are directed to apparatus of the same subject matter claimed in method/steps claim 3 and therefore, are rejected as explained in the rejections of claim 3 above.

4. Claim 4 – 5, 13 – 14, 22 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastalo (US 20010047424) in view of Kuchi (US 20020172293) and further in view of Rouquette et al. (Transmit Diversity Wireless Communication, which has been provided by the applicant in his IDS) and Hudson (US 20030043887).

Regarding claim 4, Alastalo does not disclose despreading the pilot channel and obtaining the finger weights from that.

In the same field of endeavor, however, Hudson discloses determining the combined complex channel gain estimate of the first plurality of diversity signals from the combined signal further comprises despreading a pilot channel embedded in the

combined signal to form a plurality of finger signals, a finger signal corresponding to a multipath component of the combined signal (paragraph 2; paragraph 9, paragraph 68; claim 29);

and determining the combined complex channel gain estimate from the plurality of finger signals (paragraph 2; paragraph 9, paragraph 68; claim 29).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Hudson, in the system of Alastalo since this would allow obtaining the weights of the Rake receiver, as disclosed by Hudson.

Regarding claim 5, Alastalo does not disclose calculating the covariance matrix and determining the weight using the covariance matrix and the MSME criteria.

In the same field of endeavor, however, Hudson discloses calculating the individual complex channel gain estimate for each of the plurality of antennas from the combined complex channel gain estimate further comprises determining a covariance matrix for each channel path of the plurality of channel paths; and calculating an individual complex channel gain estimate associated with each of the plurality of antennas according to covariance matrix minimum and mean square error (MMSE) criteria. (paragraph 30 – 34, 102 – 103).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Hudson, in the system of Alastalo since this would allow obtaining the weights of the Rake receiver, as disclosed by Hudson.

Claims 13 – 14, 22 – 23 are directed to apparatus of the same subject matter claimed in method/steps claims 4 – 5, 4 - 5 respectively and therefore, are rejected as explained in the rejections of claims 4 – 5, 4 – 5 above.

Allowable Subject Matter

5. Claim 29 is allowed.

6. Claims 7 – 9, 16 – 18, 25 – 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other Prior Art Cited

7. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to using training sequences for channel estimation in wireless systems:

Cooper (US 5,499,246) discloses a digital radio receiver, which detects when a portion of a burst is stolen for a control message

Raith (US 5,930,706) discloses a method detecting messages transmitted over a communications channel such as a paging channel.

Lin et al. (US 5581579) discloses a method and apparatus to adaptively control the frequency of reception in a digital wireless communication system

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Adolf DSouza
Examiner
Art Unit 2611

AD

David Payne

DAVID C. PAYNE
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